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A New Cave Milliped of the Genus *Prionomatis*
from Central Kyushu, Japan*

With 2 Text-figures

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ABSTRACT A new troglobiontic milliped of the genus *Prionomatis* is described from central Kyushu, Japan: *P. subcornigerum* n. sp. This new species is found in many caves in the southern part of Kumamoto Prefecture and the northwestern part of Miyazaki Prefecture. It shows a close affinity with *P. nanaoredense* Miyosi and *P. nomurai* Miyosi recorded from several caves in the areas northeast of the range of the present species.

This paper deals with a new cave species of *Prionomatis* occurring in the southern part of Kumamoto Prefecture in Kyushu, Southwest Japan. It has been found in ten caves and a pit distributed in the Kuma-gawa and Mimi-gawa drainages. It appears to occur also in ten other caves, although the specimens from these have not been conclusively identified due to the lack of males. The new species, named *P. subcornigerum* herein, is very similar to *P. nanaoredense* and *P. nomurai*, which occur in several caves at the northeastern part of Miyazaki Prefecture and at the southwestern part of Ōita Prefecture respectively.

The holotype and part of the paratypes of the new milliped are deposited in the National Science Museum, Tokyo. Other specimens remain in the senior author's collection.

Prionomatis subcornigerum n. sp.

[Japanese name: Tsuno Nokogiriyasude]

Diagnosis. A large troglobiontic species very similar in appearance to *P. nanaoredense* Miyosi (1956, pp. 13, 14, fig. 1) and *P. nomurai* Miyosi (1956, pp. 14,

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15, fig. 3); nearer to the former in the body form, but nearer to the latter in the shape of gonopods, especially in having a peculiar process on femur; distinguished from both the species by the details of male gonopods.

Male holotype. Color in alcohol pale greyish white; in life white. Length approximately 29 mm, greatest width about 3.1 mm (in segment 10). Body rather large, slender, nearly parallel-sided between segments 6 and 16, gradually narrowing toward both ends; antennae and legs long and slender. The shape of head and of some selected segments as shown in Fig. 1 A-C; the widths of them as follows:

Head =2.0 mm	Collum=2.1 mm	Seg. 2=2.2 mm
Seg. 3=2.3 mm	Seg. 4=2.4 mm	Seg. 5=2.8 mm
Seg. 6=3.0 mm	Seg. 17=2.8 mm	Seg. 18=2.3 mm.

Head normal in appearance, oval, convex, densely covered with short and minute hairs except at the back of vertex. Antennae rather long and slender, reaching back to the posterior border of segment 4; the ratio in length and width (in parentheses) of articles 4 through 7 is as follows: 26(6): 28(8): 20(10): 8(7); sensory groups on the last three articles well developed. Collum slightly wider than head, elliptical, angulate at the posterior corners, and with a minute notch at each lateral side; four series of fine bristles present on the surface. Segments 2-4 essentially similar in shape; dorsum moderately arched with several rows of fine bristles, and with weak sculpture; outer margin of each lateral keel slightly convex, with 3 small notches; scapular areas bordered and smooth; posterior corners nearly rectangular on segment 2, and slightly produced on others. Succeeding segments basically similar in structure to one another; dorsum slightly arched with weak sculpture as shown in Fig. 1 B, and with several rows of microscopic tubercles. Lateral keels well developed, nearly horizontal and longer than wide; upper side moderately convex, with smooth and polished surface; outer margin convex, with 5 (rarely 4) small notches; posterior corners well produced, with several rows of microscopic tubercles on the inner margins from segment 6; the teeth of segment 19 small and short. Scapular area of segments 6-18 rather thickly bordered by marginal depression, and provided with microscopic strigils on the surface. Pores small, opening on the dorsal surface of each pore-bearing keel near the second notch from the end. Legs moderately long, most part of femur visible from above when legs are extended laterad; length relationships of podomeres in segment 10: $6 > 3 > 2 > 1 = 4 = 5$; prefemur swollen dorsally, femur slightly incurved, both the podomeres being densely covered with thick bristles on the ventral surface; postfemur, tibia and tarsus with spherical bristles on the ventral surface; claw rather short and acute. Sternites quadrate, pubescent and with deep crossing furrow; posterior corners weakly produced.

Gonopodal aperture large, transversely oval. Gonopods almost fully exposed, projecting ventrad and lying parallel to the median body axis; *in situ*, its long tibio-tarsal portions crossed each other. Coxa large, cylindrical and with two macrosetae. Prefemoral portion rather small, covered with long fine setae. Femoral

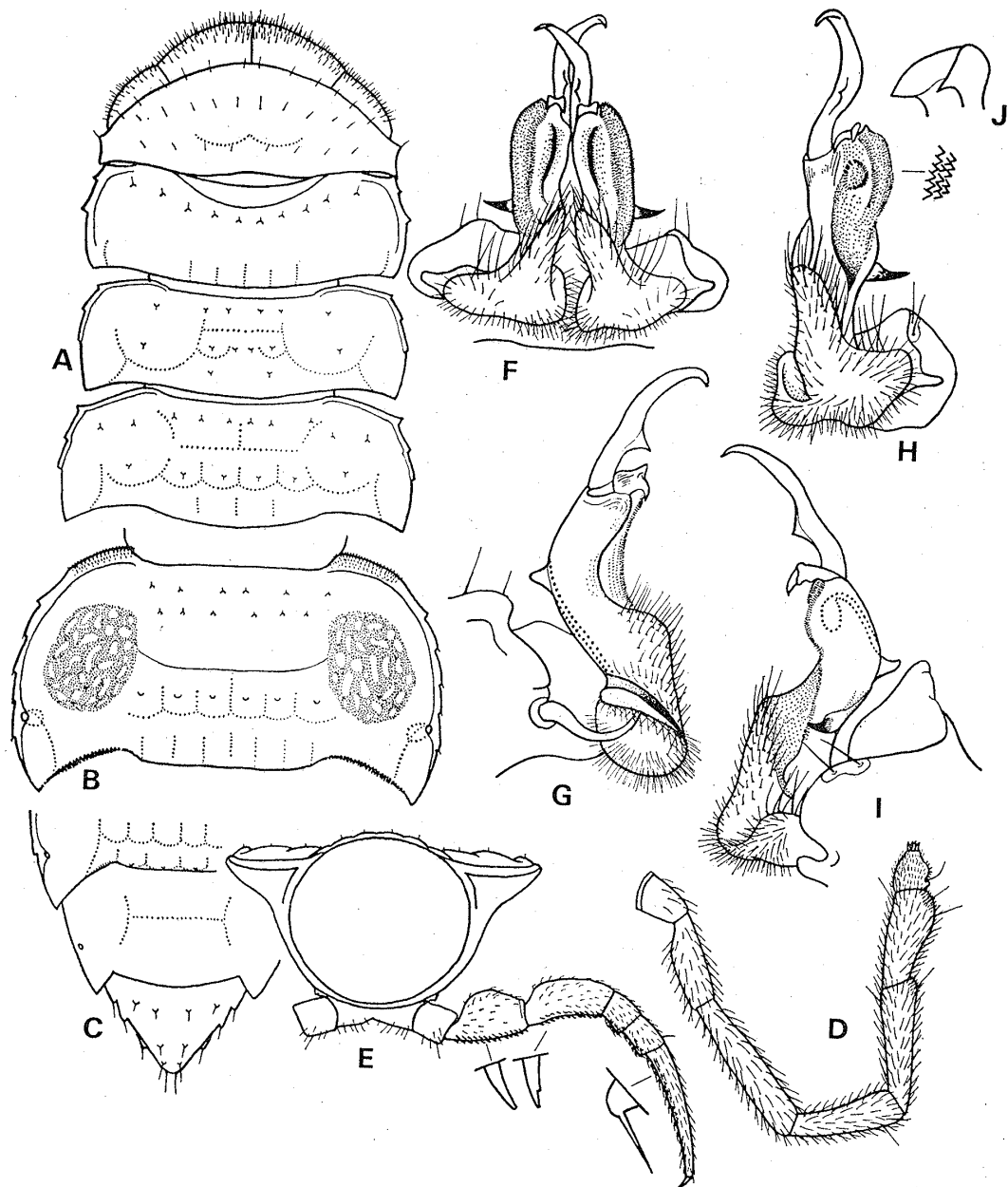


Fig. 1. *Prionomatis subcornigerum* n. sp., holotype. — A, Head and four succeeding segments, dorsal aspect. B, Segment 10, dorsal aspect. C, Caudal end of body, dorsal aspect. D, Right antenna. E, Caudal aspect of segment 10, with a right leg. F, Gonopods, *in situ*, ventral view. G–I, Left gonopod; mesial, ventral and lateral aspects. J, Terminal process on femur.

portion moderately enlarged, broad at the distal half, and with a large peculiar process on the disto-lateral side near the base, and with a terminal process; the peculiar process is horn-shaped, remarkably projecting laterad in ventral aspect; terminal process short, broad and bifurcate; outer horn present, triangular and

obtuse; clivus well developed, flattened, and densely covered with microscopic processes; cavity wide and shallow; seminal canal open at the middle of the cavity, the opening bearing microscopic marginal hairs. Tibiotarsal portion long and slender, with a small process near the base.

Female paratype. Length about 28 mm, greatest width about 2.9 mm. Other somatic characters as in the male.

Type-series. 1 ♂ (holotype), 1 ♀, 1 larva, Ohno-dô Cave, at Ohno, Ashikita-chô, Ashikita-gun, Kumamoto Pref., 3 September 1967, coll. by T. Irie.

Other records. 1 ♂, 1 ♀, Uchitani-dô Cave, at Uchitani, Itsuki-son, Kuma-gun, Kumamoto Pref. (24 July 1967, by T. Irie). 1 ♂, 3 larvae, Takasawa-dô Cave, at Takasawa of Kônosé in Kuma-mura, Kuma-gun, Kumamoto Pref. (25 July 1967, by T. Irie). 1 ♂, Tsuzurasé-dô Cave, at Tsuzurasé, Itsuki-son, Kumamoto Pref. (27 March 1968, by T. Irie); 1 ♀, the same cave (19 May 1968, by T. Irie); 1 ♀, the same cave (12 April 1969, by S. Uéno). 1 ♀, Hakiai-dô Cave, at Hakiai, Itsuki-son, Kumamoto Pref. (26 October 1968, by T. Irie); 1 ♀, the same cave (13 April 1969, by T. Irie); 1 ♂, 2 ♀♀, 13 larvae, the same cave (13 April 1969, by S. Uéno). 1 ♂, 1 ♀, 3 larvae, Senningakuré-dô Cave, at Ohsé, Kuma-mura, Kumamoto Pref. (8 April 1969, by T. Irie); 8 larvae, the same cave (4 and 6 August 1969, by T. Irie). 1 larva, Ohsé-dô Cave, at Ohsé, Kuma-mura Kumamoto Pref. (1 August 1969, by T. Irie); 3 larvae, the same cave (23 September 1969, by T. Irie); 1 ♂, 1 ♀, the same cave (19 December 1969, by T. Irie). 1 ♂, 2 larvae, Kuronita-no-taté-ana Pit, at Sakashita, Kuma-mura, Kumamoto Pref. (10 December 1972, by S. Arai). 1 ♀, 5 larvae, Shirataké-dô Cave, at Ohkawachi, Yamaé-son Kuma-gun, Kumamoto Pref. (17 May 1970, by T. Irie); 1 ♂, 2 ♀♀, the same cave (22 August 1971, by T. Irie). 1 ♂, Nakatô-dô Cave, at Nakatô, Shimofukura, Shiiba-son, Higashi-usuki-gun, Miyazaki Pref. (14 March 1970, by M. Yamada); 2 ♂♂, 1 ♀, 11 larvae, the same cave (7 April 1971, by T. Irie & S. Arai); 2 ♀♀, 1 larva, the same cave (31 July 1971, by S. Uéno); 2 ♂♂, 2 larvae, the same cave (25 November 1972, by T. Irie). 3 ♂♂, 2 ♀♀, 1 larva, Matsuginari-no-ana Cave, at Matsugi, Kamifukura, Shiiba-son, Miyazaki Pref. (7 April 1971, by T. Irie & S. Arai); 5 ♂♂, 4 ♀♀, 2 larvae, the same cave (1 August 1971, by S. Uéno).

Records of the specimens probably referable to the same species. 1 ♀, 1 larva, Kuronita-ko-ana Cave, at Sakaguchi, Kuma-mura, Kumamoto Pref. (23 November 1968, by T. Irie). 1 ♀, 1 larva, Ohkawachi-dô Cave, at Ohkawachi, Yamaé-son, Kumamoto Pref. (8 April 1973, by T. Irie). 3 larvae, Yamaguchi-dô Cave, at Yamaguchi, Yamaé-son, Kumamoto Pref. (3 September 1972, by T. Irie). 2 larvae, Semé-no-ana Cave (artificially dug), at Semé of Ayugaeri, Sakamoto-son, Yatsushiro-gun, Kumamoto Pref. (17 October 1971, by T. Irie). 2 ♀♀, Nichikô-dô Cave, at Nichikô, Sakamoto-son, Kumamoto Pref. (24 April 1972, by T. Irie). 1 larva, Irigamo-dô Cave, at Irigamo, Itsuki-son, Kumamoto Pref. (20 October 1968, by T. Irie). 1 larva, Iwato-dô Cave, at Kureko, Izumi-son, Yatsushiro-gun, Kumamoto Pref. (23 July 1967, by T. Irie). 4 larvae, Miiké-

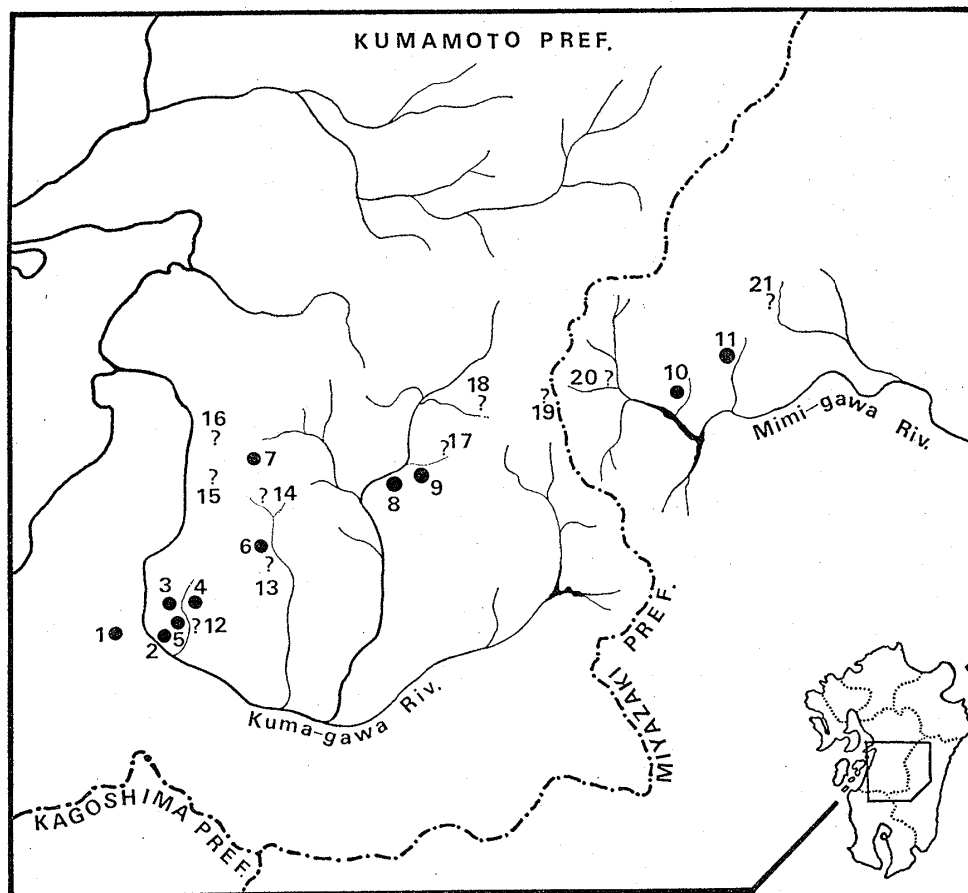


Fig. 2. Map showing the distribution of caves and pits, in which *Prionomatis subcornigerum* n. sp. has been obtained; black circles indicate the location of the caves and pit, where both sexes of the milliped have been found; question marks indicate the location of the caves and pits, where no adult male specimens have been taken. — 1, Ohno-dô Cave (type-locality); 2, Ohsé-dô Cave; 3, Senningakuré-dô Cave; 4, Takasawa-dô Cave; 5, Kuronita-no-taté-ana Pit; 6, Shirataké-dô Cave; 7, Uchitani-dô Cave; 8, Tsuzurasé-dô Cave; 9, Hakiai-dô Cave; 10, Matsugiinari-no-ana Cave; 11, Nakatô-dô Cave; 12, Kuronita-ko-ana Cave; 13, Ohkawachi-dô Cave; 14, Yamaguchi-dô Cave; 15, Séme-no-ana Cave; 16, Nichikô-dô Cave; 17, Irigamo-dô Cave; 18, Iwato-dô Cave; 19, Miiké-no-ana Pit; 20, Mizunashi-no-ana Cave; 21, Dôshidaki-no-ana Cave.

no-ana Pit, at Miiké, near Momiki, Izumi-son, Kumamoto Pref. (29 May 1971, by T. Irie). 1 ♀, Mizunashi-no-ana Cave, at Omaé, Shiiba-son, Miyazaki Pref. (6 April 1971, by T. Irie). 1 ♀, 7 larvae, Dôshidaki-no-ana Cave, at Ryôshiyabu, Morotsuka-son, Miyazaki Pref. (3 April 1971, by T. Irie & S. Arai); 1 ♀, the same cave (31 July 1971, by S. Uéno).

Notes. This new species is very similar to *P. nomurai* in the structure of male gonopods, especially in having the peculiar horn-shaped process on femur, but differs from the latter species by the situation of the process. In *P. nomurai*, the

horn-shaped process is situated at a dorso-distal portion as a modification of the outer horn, but in *P. subcornigerum*, the process is situated at the base of the lateral side as an accessory process. Other differences between them will be summarized as follows:

	<i>P. nomurai</i>	<i>P. subcornigerum</i>
Lateral notches	conspicuous and sharp	small and not so sharp
Gonopods:		
cavity	rather narrow and deep	rather wide and shallow
outer horn	large and horn-shaped	small and triangular
terminal process on femur	short	more projecting
other accessory process on femur	none	a large horn-shaped process present
Body length of adult specimens	medium-sized, 25 mm or less	rather large-sized, 25 mm or more

As was recorded before, this species is widely distributed in Kumamoto and Miyazaki Prefectures, having been known from eleven caves and pit in the Kuma-gawa and Mimi-gawa drainages (cf. Fig. 2, Nos. 1–11). Several female and many larval specimens of troglobiontic *Prionomatis* were obtained from other caves and pits in the same area (cf. Fig. 2, Nos. 12–21). These specimens cannot be determined satisfactorily, but are probably conspecific with the present new species, since all the locality caves lie within the distributional range of *P. subcornigerum*.

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